



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
-----------------	-------------	----------------------	---------------------

09/323,650 06/01/99 CHUBB

D LEW-16,682-1

EXAMINER

MMC2/0926

KENT N STONE
OFFICE OF CHIEF COUNSEL NASA GLENN
RESEARCH CENTER MAIL STOP 500 118
21000 BROOKPARK ROAD
CLEVELAND OH 44135

DE JESUS, L

ART UNIT

PAPER NUMBER

2859

DATE MAILED:

09/26/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/323,650

Applicant(s)

CHUBB ET AL.

Examiner

Lydia M. De Jesús

Art Unit

2859

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 August 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1-3, 5, 10 and 12 are finally rejected under 35 U.S.C. 102(b) as being anticipated by Mihalcz et al. [hereinafter Mihalcz].

Mihalcz discloses an optical temperature sensor comprising an emitter [12] having a selective energy emission band, said emitter converting thermal energy to energy within said emission band in response to a temperature of said emitter (see Figure 3); a light pipe [14] having a first end and a second end, said first end communicating with said emitter; an optical bandpass filter [18] communicating with said second end, said filter having a pass band within said emission band; and a detector [16] communicating with said filter, said detector detecting said emitter energy as a measure of said temperature (Col. 4, lines 31-32).

Said emitter contains a rare earth element (Col. 2, lines 54-57, and Col. 3, lines 7-15) and is composed of a rare earth oxide i.e., Y_2O_3 . Mihalcz also shows selecting an emitter being a high temperature host material which is doped with a rare earth element i.e., $Y_2O_3 : Gd$.

Mihalcz teaches the use of a light pipe composed of sapphire or quartz (Col. 3, lines 18-20).

Art Unit: 2859

3. Claims 1-3, 10 and 16-17 are finally rejected under 35 U.S.C. 102(b) as being anticipated by Tregay.

Tregay discloses an optical temperature sensor comprising an emitter (in recess 28a or 28b) having a selective energy emission band, said emitter converting thermal energy to energy within said emission band in response to a temperature of said emitter; a light pipe [22] having a first end and a second end, said first end communicating with said emitter; an optical bandpass filter [42] communicating with said second end, said filter having a pass band within said emission band (see Column 5, lines 46-66); and a detector [44] communicating with said filter, said detector detecting said emitted energy as a measure of said temperature.

Said emitter contains a rare earth element, in particular is composed of a rare earth oxide i.e., yttrium oxide (Col. 5, lines 14-18). Said light pipe is composed of sapphire for high temperature operation of the sensor in the range of for example 1000° C to 2000 ° C or approximately 1273 K to 2273 K (Column 5, lines 34-41).

4. Claim 1 is finally rejected under 35 U.S.C. 102(b) as being anticipated by Wissinger.

Wissinger discloses an optical temperature sensor comprising an emitter (laser diode devices [12]) having a selective energy emission band (Col. 3, lines 18-24), said emitter converting thermal energy to energy within said emission band in response to a temperature of said emitter (see for example Col. 1, line 65 through Col. 2, line 3); a light pipe [14] having a first end and a second end, said first end communicating with said emitter; an optical bandpass filter [in bandpass filter array 22] communicating with said second end, said filter having a pass band within said emission band (Col. 4, lines 4-12); and a detector [18] communicating with said filter, said detector detecting said emitted energy as a measure of said temperature.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 4, 7-9 and 13-17 are finally rejected under 35 U.S.C. 103(a) as being unpatentable over Mihalczo in view of Milstein et al. [hereinafter Milstein].

Mihalczo discloses an optical temperature sensor as claimed, as stated above in paragraph 2, and further teaches that the sensor can be customized for a particular temperature range of operation by choosing an appropriate thermophosphor material (see Col. 4, lines 24-30), but fails to disclose the material for the emitter being one among the group of a rare earth aluminum garnet, ytterbium oxide, or yttrium aluminum garnet doped with a rare earth element i.e., yttrium aluminum garnet doped with ytterbium. Mihalczo also lacks a detector being a silicon detector, a lead sulfide detector or an indium antimonide detector and discloses that depending on the

Art Unit: 2859

thermophosphor material selected, temperature can be monitored in environments up to 1500° C (approximately 1773 K).

Milstein shows a sensor for converting thermal energy into electricity by applying thermal energy to a selective emitter and detecting the emitted radiation from the emitter with a radiation detector. Among the materials shown by Milstein for the selective emitter are ytterbium oxide and Nd:YAG (see also line 63 of Column 5 through line 3 of Column 6).

Therefore, the particular emitter material, absent any criticality, is only considered to be the use of a "preferred" emitter material out of a plurality of well known materials commonly known in the art to emit radiation as a response to thermal energy applied to the material that a person having ordinary skill in the art at the time the invention was made would have find obvious to provide using routine experimentation based, among other things, on the intended use of applicant's apparatus, i.e., suitability for the intended use of applicant's apparatus. See In re Leshin, 125 USPQ 416 (CCPA 1960) where the court stated that a selection of a material on the basis of suitability for the intended use of an apparatus would be entirely obvious.

Mihalczo discloses the use of a photodiode or a photomultiplier tube as the detector of the disclosed optical temperature sensor. Milstein teaches the use of a silicon photodiode as the detector in the sensor configuration shown. Hence, the particular radiation detecting means configuration claimed by applicant i.e., silicon detector/ lead sulfide detector/ indium antimonide detector, absent any criticality, is considered nothing more than one of numerous radiation detecting means configurations that a person having ordinary skill in the art will find obvious to provide for the purpose of detecting the emitted radiation from the emitter of the temperature sensor.

Furthermore, as discussed above the temperature range of operation of the sensor will depend on the material selected for the emitter and Milstein further teaches (see Column 34, lines 34-50) that some of the selective emitter materials already known in the art will perform in environments above 2000° C (approximately 2215 K).

Therefore, the temperature range of operation of sensor resulting from the combination of Mihalczo and Milstein will depend on the selected material for the emitter and by selecting an appropriate emitter will operate above 2000 K, as taught by Milstein.

8. Claim 11 is finally rejected under 35 U.S.C. 103(a) as being unpatentable over Mihalczo in view of Rusanov et al. [hereinafter Rusanov].

Mihalczo discloses an optical temperature sensor as claimed, as stated above in paragraph 2, but fails to disclose said light pipe being composed of yttrium oxide.

Rusanov teaches that it is very well known in the art that yttrium oxide is one among known materials used for making light pipes i.e., optic fibers.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the light pipe of the optical temperature sensor of Mihalczo for a light pipe composed of yttrium oxide since the use of this particular material, absent any criticality, is only considered to be the use of a "preferred" material out of a plurality of well known materials commonly selected for manufacturing light pipes that a person having ordinary skill in the art at the time the invention was made would have find obvious to provide using routine experimentation based, among other things, on the intended use of applicant's apparatus, i.e., suitability for the intended use of applicant's apparatus. See In re Leshin, 125 USPQ 416

(CCPA 1960) where the court stated that a selection of a material on the basis of suitability for the intended use of an apparatus would be entirely obvious.

Response to Arguments

9. Applicant's arguments filed August 28, 2001 have been fully considered but they are not persuasive.

In response to Applicant's arguments to the rejection of claims 1-3, 5, 10 and 12 as being anticipated by Mihalczo et al under 35 U.S.C. 102(b): Applicant argues that neither of the two phosphors in the temperature sensor disclosed by Mihalczo converts thermal energy within a selective energy emission band as in the presently claimed invention. It is considered that the emitter is formed by the combination of these two phosphors in coating [12] of the temperature sensor disclosed by Mihalczo and hence, the behavior of the emitter as a response to thermal energy is the result of the combined behavior of both phosphors. Applicant should note that Mihalczo discloses that upon absorption of a thermal neutron by the first phosphor charged particles are produced which, when detected by the second phosphor, result in visible light scintillations. Therefore, the thermal energy inherently involved or transferred during the absorption of the neutron by the first phosphor is converted into visible radiation / selective emission band. Hence, the rejection of these claims in view of Mihalczo et al is considered proper and the rejections of claims 4, 7-9, 11 and 13-17 under 35 U.S.C. 103(a) are also considered to be proper.

Applicant should also note that the argument stating that “the present invention uses a sensor that absorbs thermal energy and emits it in a narrower band” is not directed to claimed limitations.

With respect to Applicant’s arguments with respect to the rejection of claim 1 as being anticipated by Wissinger under 35 U.S.C. 102(b): Applicant has stated that the diodes of the apparatus disclosed by Wissinger do not convert thermal energy to energy within a selective emission band as in the presently claimed invention since although the emission characteristics of the diodes change with respect to their temperature, the emissions themselves are caused by application of electrical power to the diodes and instead the emission characteristics of an electrically powered diode are altered by temperature. It is considered that a change in temperature of the emitter, in this case one of said diodes, consists of thermal energy transferred to or from the emitter structure and hence, the emitter structures disclosed by Wissinger are converting thermal energy to energy within a selective emission band. Said selective emission band is considered to correspond to the range of wavelengths within which the emitter emits energy during a change of temperature of the emitter within the range of temperature of operation of the apparatus disclosed by Wissinger. Hence, the rejection of claim 1 is considered to be proper.

With respect to arguments presented by Applicant with respect to the rejection of claims 1-3, 10 and 16-17 as being anticipated by Tregay under 35 U.S.C. 102(b): Applicant has stated that there is no teaching in Tregay that the bandpass filter is to be matched to the emission spectra of the emitter and that in fact, Tregay even teaches the use of two filters about two different wavelengths in making measurements and hence there is no specified bandpass filter

Art Unit: 2859

having a pass band within the emission band. Applicant should note that the argument presented that “there is not teaching that the bandpass filter is to be matched to the emission spectra of the emitter” does not refer to claimed limitations. The claimed optical temperature sensor requires that the bandpass filter have a pass band within the emission band of the emitter. Applicant should note that, in the optical temperature sensor disclosed by Tregay, it is inherent that each of the bandpass filters has a pass band within the emission band of the emitter. Otherwise, the sensor is inoperative because the radiation emitted by the emitter will not reach the detector. Hence, the apparatus disclosed by Tregay discloses at least one bandpass filter having a pass band within the emission band of the emitter and the rejection of these claims is considered to be proper.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Art Unit: 2859

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lydia M. De Jesús whose telephone number is (703) 306-5982. The examiner can normally be reached on Mondays-Fridays (8:30-6:00), alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego F.F. Gutierrez can be reached on (703) 308-3875. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 305-3431 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

LDJ
September 25, 2001



Diego F.F. Gutierrez
Supervisory Patent Examiner
Technology Center 2800